

CLAIMS

What is claimed is:

- 1 1. A magnetic head comprising:
2 a magnetoresistive sensor having first and second laterally opposed sides defining
3 a track width; and
4 an in stack bias layer having a portion formed within said track with and first and
5 second outer portions extending laterally outward beyond said track width.

- 1 2. A magnetic head as in claim 1, wherein said bias layer further comprises first and
2 second magnetic layers separated by a non-magnetic coupling layer and said first and
3 second magnetic layers having magnetizations antiparallel coupled across said non-
4 magnetic spacer layer.

- 1 3. A magnetic head as in claim 1, wherein said first and second magnetic layers
2 comprise CoPtCr.

- 1 4. A magnetic head as in claim 1, wherein said non-magnetic spacer layer comprises
2 Ru.

1 5. A magnetic head as in claim 1 further comprising a magnetic hard bias material,
2 disposed substantially within said track width and disposed between said first and second
3 magnetic layers and said free layer.

1 6. A magnetic head as in claim 1 further comprising a nonmagnetic spacer layer
2 disposed between said bias layer and said free layer.

1 7. A magnetic head as in claim 1 wherein said first and second magnetic layers of
2 said bias layer each have a thickness of 20 to 40 angstroms.

1 8. A magnetic head as in claim 1 further comprising a seed layer formed adjacent
2 one of said first and second magnetic layers.

1 9. A current in plane magnetoresistive sensor, comprising:
2 a magnetic free layer having a magnetization biased parallel to an air bearing
3 surface (ABS);
4 a magnetic pinned layer having a magnetization pinned perpendicular to said
5 ABS;
6 a non-magnetic spacer layer disposed between said free layer and said pinned
7 layer;
8 said free layer, pinned layer, and spacer layer having first and second laterally
9 opposed sides defining a track width;

10 a magnetic bias layer formed adjacent said free layer within said track width;
11 a bias pinning layer formed adjacent said bias layer opposite said free layer within
12 said track width, said bias pinning layer extending laterally outward substantially
13 beyond said track width.

1 10. A magnetoresistive sensor as in claim 9, wherein said bias pinning layer further
2 comprises first and second magnetic layers formed of a high coercivity magnetic
3 material, and separated from one another by non-magnetic coupling layer, said first and
4 second layers of high coercivity material having magnetizations anti-parallel coupled
5 with one another.

1 11. A magnetoresistive sensor as in claim 10 wherein said first and second high
2 coercivity magnetic material layers comprise CoPtCr.

1 12. A magnetoresistive sensor as in claim 10 wherein said first and second high
2 coercivity material layers each have a thickness of between 20 and 40 angstroms.

1 13. A magnetoresistive sensor as in claim 10, wherein said non-magnetic coupling
2 layer comprises Ru.

1 14. A magnetoresistive sensor as recited in claim 9 further comprising a seed layer
2 formed adjacent said bias pinning layer opposite said bias layer.

1 15. A magnetoresistive sensor as in claim 14 further wherein said seed layer
2 comprises Cr.

1 16. A magnetoresistive sensor as in claim 14 wherein said seed layer comprises Cr
2 and wherein said seed layer has a thickness of from 20 to 40 angstroms.

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1 17. A magnetoresistive sensor as in claim 9 further comprising first and second
2 electrically insulating side walls formed at said first and second sides defined by said free
3 layer, said pinned layer, and said spacer layer.

1 18. A magnetoresistive sensor as in claim 17 wherein said first and second electrically
2 insulating side walls comprise alumina (Al₂O₃).

1 19. A magnetoresistive sensor as in claim 17, further comprising at least one
2 magnetic shield having first and side shielding portions extending into a sensor stack
3 height region, and being formed adjacent a portion of said electrically insulating side
4 walls and extending laterally outward therefrom.

1 20. A magnetoresistive sensor as in claim 10 wherein said first and second magnetic
2 layers of said bias pinning layer have substantially the same magnetic thickness.